

WHAT IS CLAIMED IS:

1. An optical transceiver module for emitting transmitting light along a predetermined axis and receiving receiving light having propagated along the predetermined axis, said optical transceiver module comprising:
- 5
- a mount substrate disposed so as to intersect with the predetermined axis and having first and second principal surfaces facing each other;
- 10
- a transmitting semiconductor laser mounted on the first principal surface and configured to emit light of a first wavelength;
- a receiving photodiode mounted on the predetermined axis and on the second principal surface and configured to receive light of a second wavelength;
- 15
- a communicating hole provided in a region of the mount substrate where the receiving photodiode is mounted, and letting the first and second principal surfaces communicate with each other; and
- 20
- a first filter disposed on the predetermined axis and in a region intersecting with the first principal surface, and configured to reflect the light of the first wavelength and transmit the light of the second wavelength,
- 25
- wherein the light of the first wavelength having been emitted from the transmitting semiconductor laser

and propagating along the first principal surface is reflected by the first filter and emitted as the transmitting light along the predetermined axis, and wherein the light of the second wavelength as the  
5 receiving light having propagated along the predetermined axis is transmitted by the first filter and travels through the communicating hole to be received by the receiving photodiode.

2. The optical transceiver module according to  
10 Claim 1, comprising a monitoring photodiode mounted on the first principal surface of the mount substrate so as to interpose the transmitting semiconductor laser between the first filter and the monitoring photodiode, and configured to receive backward light from the  
15 transmitting semiconductor laser.

3. The optical transceiver module according to Claim 1, comprising a monitoring photodiode mounted on the first principal surface of the mount substrate so as to interpose the first filter between the  
20 transmitting semiconductor laser and the monitoring photodiode, and configured to receive light emitted from the transmitting semiconductor laser and transmitted by the first filter.

4. The optical transceiver module according to  
25 Claim 1, wherein the receiving photodiode has a backside-illuminated type structure.

5. The optical transceiver module according to Claim 4, wherein a second filter for shutting out the light of the first wavelength is provided between the receiving photodiode and the second principal surface of the mount substrate.

6. The optical transceiver module according to Claim 4, wherein the receiving photodiode has a filter layer for absorbing the light of the first wavelength.

7. The optical transceiver module according to Claim 1, comprising an amplifier mounted on the second principal surface and configured to amplify an electric signal from the receiving photodiode.

8. The optical transceiver module according to Claim 1, wherein the mount substrate comprises:

a first substrate including the first principal surface and a third principal surface facing the first principal surface; and

a second substrate including the second principal surface and a fourth principal surface facing the second principal surface,

wherein the mount substrate is formed by assembling the first and second substrates in a state in which the third and fourth principal surfaces face each other.

9. The optical transceiver module according to Claim 1, comprising a lens for condensing the

transmitting light and the receiving light, which is located on the predetermined axis so that the first filter is interposed between the receiving photodiode and the lens.

5           10. The optical transceiver module according to Claim 1, comprising a casing for housing the mount substrate.

11. The optical transceiver module according to Claim 10, wherein the casing comprises:

10           a first casing portion located on the first principal surface side; and

          a second casing portion located on the second principal surface side,

          wherein the mount substrate is housed in the casing in a state in which the mount substrate is sandwiched between the first casing portion and the second casing portion.

15           12. The optical transceiver module according to Claim 1, wherein the mount substrate is covered by a resin body.

13. The optical transceiver module according to Claim 9, wherein the mount substrate is covered by a resin body and wherein the lens is buried in the resin body.

25           14. The optical transceiver module according to Claim 1, comprising a fit portion provided on the first

principal surface side of the mount substrate and configured to hold a ferrule with an optical fiber therein in a fit state.

5        15. An optical transceiver module for emitting transmitting light along a predetermined axis and receiving receiving light having propagated along the predetermined axis, said optical transceiver module comprising:

10        a first mount substrate disposed so as to intersect with the predetermined axis and having first and second principal surfaces facing each other;

      a transmitting semiconductor laser mounted on the first principal surface and configured to emit light of a first wavelength;

15        a communicating hole provided in a region where the predetermined axis intersects with the first mount substrate, and letting the first and second principal surfaces communicate with each other;

20        a second mount substrate disposed so as to intersect with the predetermined axis and having third and fourth principal surfaces facing each other;

      a receiving photodiode mounted on the predetermined axis and on the third principal surface and configured to receive light of a second wavelength;  
25        and

      a first filter disposed on the predetermined axis

and in a region intersecting with the first principal surface, and configured to reflect the light of the first wavelength and transmit the light of the second wavelength,

5            wherein the first mount substrate and the second mount substrate are assembled so that the second principal surface faces the third principal surface,

          wherein the light of the first wavelength having been emitted from the transmitting semiconductor laser and propagating along the first principal surface is  
10            reflected by the first filter and emitted as the transmitting light along the predetermined axis, and wherein the light of the second wavelength as the receiving light having propagated along the  
15            predetermined axis is transmitted by the first filter and travels through the communicating hole to be received by the receiving photodiode.

16. The optical transceiver module according to Claim 15, comprising a monitoring photodiode mounted on  
20            the first principal surface of the first mount substrate so as to interpose the transmitting semiconductor laser between the first filter and the monitoring photodiode, and configured to receive backward light from the transmitting semiconductor  
25            laser.

17. The optical transceiver module according to

Claim 15, comprising a monitoring photodiode mounted on the first principal surface of the first mount substrate so as to interpose the first filter between the transmitting semiconductor laser and the monitoring photodiode, and configured to receive light emitted from the transmitting semiconductor laser and transmitted by the first filter.

18. The optical transceiver module according to Claim 15, wherein the receiving photodiode has a frontside-illuminated type structure.

19. The optical transceiver module according to Claim 15, wherein a second filter for shutting out the light of the first wavelength is provided on the second principal surface in the region where the communicating hole in the first mount substrate is provided.

20. The optical transceiver module according to Claim 15, comprising an amplifier mounted on the third principal surface of the second mount substrate and configured to amplify an electric signal from the receiving photodiode.

21. The optical transceiver module according to Claim 15, comprising a lens for condensing the transmitting light and the receiving light, which is located on the predetermined axis so that the first filter is interposed between the receiving photodiode and the lens.

22. The optical transceiver module according to Claim 15, comprising a casing located on the first principal surface side of the first mount substrate, wherein the first mount substrate is sandwiched between the casing and the second mount substrate.

23. The optical transceiver module according to Claim 15, wherein a resin body is placed on the first principal surface of the first mount substrate.

24. The optical transceiver module according to Claim 21, wherein a resin body is placed on the first principal surface of the first mount substrate and wherein the lens is buried in the resin body.

25. The optical transceiver module according to Claim 15, comprising a fit portion provided on the first principal surface side of the first mount substrate and configured to hold a ferrule with an optical fiber therein in a fit state.

26. An optical transceiver module for emitting transmitting light along a predetermined axis and receiving receiving light having propagated along the predetermined axis, said optical transceiver module comprising:

a mount substrate disposed so as to intersect with the predetermined axis and having first and second principal surfaces facing each other;

a transmitting semiconductor laser mounted on the



first principal surface and configured to emit light of a first wavelength;

5 a receiving photodiode provided on the predetermined axis and on the second principal surface side and configured to receive light of a second wavelength;

10 a communicating hole provided in a region of the mount substrate intersecting with the predetermined axis, and letting the first and second principal surfaces communicate with each other; and

15 a first filter disposed on the predetermined axis and in a region intersecting with the first principal surface, and configured to reflect the light of the first wavelength and transmit the light of the second wavelength,

20 wherein the light of the first wavelength having been emitted from the transmitting semiconductor laser and propagating along the first principal surface is reflected by the first filter and emitted as the transmitting light along the predetermined axis and wherein the light of the second wavelength as the receiving light having propagated along the predetermined axis is transmitted by the first filter and travels through the communicating hole to be  
25 received by the receiving photodiode.